institution of an imperial bureau of anthropology, while a cognate matter will be discussed in a paper by Mr. H. Peake, in which the author urges the desirability of instituting an anthropometric survey of Great Britain.

Section I (Physiology).—Presidential address, Prof. J. S. Macdonald; discussion on ventilation in confined quarters, especially in relation to ships, Dr. L. Hill, Prof. N. Zuntz, Mr. L. Woolhard; discussion on inhibition, opened by Prof. C. S. Sherrington, followed by Mr. Keith Lucas, conduction between muscle and nerve, with special reference to inhibition, and Prof. J. S. Macdonald; frequency of colour-blindness in males, Dr. Edridge-Green; heat production and body temperature during rest and work, Prof. J. S. Macdonald and Dr. J. E. Chapman; rhythmical stimulation of cooled frog's nerve, Dr. J. Tait; electrical stimulation of the frog's heart, Dr. J. Tait; photochemical changes in yohimbine solutions, Dr. J. Tait and Dr. J. A. Hewitt; some considerations on the influence of hæmoglobin in the hæmolysis of red blood corpuscles, Dr. H. E. Roaf; the chemistry of heat coagulation of proteins, Dr. Harriette Chick and Dr. C. J. Martin; new researches on phagocytosis, Prof. H. J. Hamburger; a photometer for hetarochromatic photometry, Prof. C. S. Sherrington; model to illustrate Listing's law of the movements of the eyeball, Prof. C. S. Sherrington; comparison between the nervous taxis of the cat's knee and that of the anthropod claw, Miss S. C. M. Sowton and Prof. C. S. Sherrington.

Section K (Botany).—Presidential address, Prof. F. E. Weiss. Joint meeting with Sections C and E on the relation of the present plant population of the British Isles to the Glacial period, opened by Mr. Clement Reid. Discussion on the principles of constructing phyto-geographical maps. Semi-popular lecture, by Mr. Francis Darwin. *Papers:* Some petrified Jurassic plants from Scotland, Prof. A. C. Seward; recent work on the Jurassic plants of Yorkshire, H. H. Thomas; the structure of the oldest known synangium, and its bearing on the origin of the seed, Dr. M. Benson; on the mode of formation of the Pettycur material as gathered from internal evidence; a fifteen-year study of advancing sand-dunes, Prof. H. C. Cowles; new proposals in ecology, Prof. F. E. Clements; phytogeography as an experimental science, Prof. Massart; the vegetation of pebble beaches, Prof. F. W. Oliver; the brown seaweeds of a salt-marsh, Miss S. M. Baker; the Swiss National Park and its flora, Prof. C. Schröter; the water-content of acidic peats, W. B. Crump; the wilting of moorland plants, W. B. Crump; the presumptive hybrid *Anagallis carnea,* Prof. F. E. Weiss; the morphology of leguminous nodules, Prof. Bottomley; nuclear osmosis as a factor in mitosis, A. A. Lawson; nuclear division in Spongospora, A. S. Horne; the polyphyletic origin of the Cornaceæ, A. S. Horne; the transference of sugar from the host plant to a parasitic Cuscuta, S. Mangham.

Subsection Agriculture.—Presidential address, Prof. W. Bateson; cider sickness, B. T. P. Barker and Mr. Hillier; the effect of grass on apple trees, S. U. Pickering; the inheritance of strength in wheat, Prof. T. B. Wood; crystalline nitrogenous constituents of mangolds, Prof. T. B. Wood; suggestions relating to the existing system of imperial avoirdupois weights, J. Porter. Discussion on bacterial diseases of plants, opened by Prof. M. C. Potter; bacterial diseases of the celery and swede, J. H. Priestley; bacterial gum diseases, F. T. Brooks; bacterial diseases of the potato plant in Ireland, Dr. G. H. Pethybridge; experiments on the wart disease of potatoes, G. T. Malthouse; potato disease, A. S. Horne. *Discussion:* How best may the university agricultural departments come into contact with the farmer, Principal Ainsworth Davis; the American and Canadian systems, R. Hart-Synnot: the place of the agricultural instructor, J. H. Burton. Joint discussion with the Chemical Section. The part played by enzymes in the economy of plants and animals. Popular lecture by Mr. A. D. Hall, the soils and farming of the Southdowns; commercial ovariotomy in pigs, F. H. A. Marshall and K. J. J. Mackenzie; temperature variations during the œstrous cycle in cows, F. H. A. Marshall and K. J. J. Mackenzie; the effects of ventilation on the temperature and carbon dioxide of the air of byres, J. Hendrick; the effect of minute electrical currents on the growth and metabolism of bacteria, Prof. J. H. Priestley and Miss E. M. Lee; the effect of high tension electric discharges and current electricity on plant respiration, Prof. J. H. Priestley and Mr. R. C. Knight; the effect of pyrophosphates on animals, Dr. J. A. Gardner; application of genetics to horse-breeding, C. C. Hurst; the inheritance of milk yield in cattle, J. Wilson. The *chief features* of the programme are: Discussions on problems at present of great importance in agriculture: (1) Bacterial diseases of plants; (2) the University Agricultural Departments and the practical farmer; (3) the *rôle* of enzymes in the economy of plants and animals; (4) some important live stock questions; (5) semi-popular lecture: a scientific study of the local agriculture.

NOTES.

The Brussels correspondent of *The Times* announces that Prof. W. Spring, professor of general chemistry in the University of Liège, died on July 17 after an operation on the throat.

The Council of the Royal Society of Arts attended at Clarence House on Friday, July 14, when the Duke of Connaught, president of the society, presented its Albert Medal to the Hon. Sir C. A. Parsons, F.R.S., "for his experimental researches into the laws governing the efficient action of steam in engines of the turbine type and for his invention of the reaction type of steam turbine and its practical application to the generation of electricity and other purposes."

A meeting of the Institution of Mechanical Engineers will be held on July 25 and 26, at Zürich. The meetings will be held in the Swiss Polytechnikum. Among the papers to be read may be mentioned:—Electric traction in Switzerland, by Mr. E. Huber-Stockar, of Zürich; results of experiments with Francis turbines and tangential (Pelton) turbines, by Prof. Franz Prášil, of Zürich; some new types of dynamometers, by Dr. Alfred Amsler, of Schaffhausen; rack-railway locomotives of the Swiss mountain railways, by Mr. T. Weber and Mr. S. Abt, of Winterthur; high-pressure water-power works, by Mr. L. Zodel, of Zürich.

The annual general meeting of the Society of Chemical Industry was held last week in Sheffield, under the presidency of Mr. Walter F. Reid, a summary of whose address appears elsewhere in this issue. Dr. Rudolf Messel, of London, was elected president for the ensuing year. The applied science department of the University was visited, and in an address given to the visitors, Prof. Arnold said that for the future students of the Royal School of Mines, if they wish to obtain the School of Mines diploma for iron and steel metallurgy, must take their fourth year of study in the metallurgical department of the University of Sheffield, and must pass its examination. Numerous visits were made to factories in and near Sheffield, and the visitors were entertained at several receptions.

An important Act has been adopted by the New York legislature dealing with the sale in New York State of wild American game. Owing to the efforts of Senator H. R. Bayne to secure the passing of the Bill, the new Act is often called the Bayne law. Stated briefly, the new law prohibits in New York State, at all seasons, the sale, or importation for sale, of any species of American wild game, save hares and rabbits. These rodents have been declared a pest to fruit-growers. No longer will it be possible for ruffed grouse, pinnated grouse, any American quail, woodcock, snipe, or any American shore-bird, wild goose, brant, or wild ducks of any species, to be sold in the State of New York, no matter where they may have been killed. The Bayne law provides, however, that certain species of game that can be reared successfully in captivity, and killed by hand, may be sold and consumed, under certain restrictions.

THE twenty-sixth congress of the Royal Sanitary Institute is to be held in Belfast on July 24 to 29. Dr. Louis C. Parkes, deputy-chairman of the council of the institute, will deliver a lecture to the congress on "The Prevention of Tuberculosis: A National Task." Prof. H. R. Kenwood will deliver the popular lecture on "The Open Window." More than two hundred authorities, including foreign and colonial Governments, Government departments, county councils, county boroughs, and other sanitary authorities, have already appointed delegates to the congress; and as there are over four thousand members and associates in the institute, a large attendance is expected. A health exhibition of apparatus and appliances relating to health and domestic use will be held, as practical illustration of the appliances and carrying out of the principles and methods discussed at the meetings. There will be many exhibits relating to the planning of cities and towns arranged by the executive committee of the Town Planning Exhibition. The meetings of the congress have been arranged in two sections, one concerned with sanitary science and preventive medicine, the other with engineering and architecture. Conferences have been arranged during the meeting of municipal representatives, port sanitary authorities, medical officers of health, engineers and surveyors, veterinary inspectors, sanitary inspectors, women on hygiene, and on the hygiene of childhood. The local honorary secretaries are Messrs. W. H. Bailie, J. Munce, and J. G. Harris.

THE fifteenth International Congress on Hygiene and Demography will be held in Washington, D.C., from September 23 to 28, 1912, under the honorary presidency of the President of the United States. Dr. H. P. Walcott, president of the State Board of Health of Massachusetts, will be the active president. Twenty-two Governments have accepted already an invitation to participate, and in addition each of the States of the Union has received an invitation which includes its contained cities. The committee on organisation includes Dr. Hermann Biggs, Dr. John S. Billings, Prof. R. H. Chittenden, Prof. Irving Fisher, Prof. Theobald Smith, and Prof. W. H. Welch. The secretary-general is Dr. John S. Fulton, Army Medical Museum, Washington, D.C. The official languages will be English, French, and German. The work of the congress will include an exhibition of recent progress and the present condition of the public health movement in the cooperating countries, and scientific meetings. For the latter the congress will be divided into nine sections. The sections, with the presidents, are:—(1) Hygienic Microbiography and Parasitology, Prof. Theobald Smith; (2) Dietetic Hygiene, Hygienic Physiology, Prof. R. H. Chittenden; (3) Hygiene of Infancy and Childhood and School Hygiene, Dr. A. Jacobi; (4) Industrial and Occupational Hygiene, Dr. G. M. Kober; (5) Control of Infectious Diseases, Dr. Hermann Biggs; (6) State and Municipal Hygiene, Dr. Frank F. Westbrook; (7) Hygiene of Traffic and Transportation, Dr. W. Wyman; (8) Military, Naval and Tropical Hygiene, Dr. H. G. Beyer; (9) Demography, Prof. Walter J. Willcox. Inquiries and applications for membership should be addressed to the secretary-general.

THE account in the July issue of *Man*, by Miss A. C. Breton, of some of the museums of archæology and ethnology in America, will excite among British students of these sciences mingled feelings—admiration at the enterprise and liberality of the American people, and regret that the contrast between the institutions of America and those in England is so clearly to our disadvantage. The museums described in this paper are the New York Natural History Museum, the Brooklyn Institute, the Peabody Museum of Harvard College, the Yale University Museum, the Philadelphia Academy of Sciences, the National Museum at Washington, and the National Museum of San José, Costa Rica. Practically all these representative collections are provided with suitable buildings and adequate staffs; each has its library, to which access is readily permitted, and arrangements are made by which the officials usually spend part of each year in field work, and are thus in a position to supply to inquirers first-hand information.

THE present uncertainty of some of the evidence on the ethnology of the Australian race is embarrassing to those who are engaged in the study of the aborigines of that continent. Prof. Frazer, for instance, in his recently published treatise on "Totemism and Exogamy," bases his conclusions regarding the customs of the Arunta tribe on the researches of Messrs. Spencer and Gillen, and dismisses the sources upon which the Rev. Mr. Strehlow has drawn in his description of another branch of the same tribe as "deeply tainted." Again, in the July issue of *Man* Mr. R. S. Mathews contradicts the statement of Dr. Howitt that descent among the Kaiabara tribe is patrilinear, and suggests that this error has led Mr. A. Lang into erroneous conclusions regarding them. Mr. Lang, again, in the June issue of *Man*, disputes Mr. Mathews' view that the phratries represent two ancient distinct races, one of the Papuasian type, with curly hair, the other fairer, with straight hair, akin to the Dravidians and Veddahs. It is much to be desired that the Federal Government, by the establishment of an ethnological bureau or by the appointment of a special commission, should undertake an official investigation into the ethnology of the aborigines before they finally disappear, and arrange for the preparation of a series of authoritative monographs on the native races, such as the valuable series which we owe to the enlightened Government of the United States on the American Indians.

IN *The Entomologists' Monthly Magazine* for July, Mr. E. G. Bayford directs attention to the potency of electric light in attracting insects, and its consequent value to collectors, more especially those to whom beetles are the chief favourites.

TO *Naturwissenschaftliche Wochenschrift* for July 2, Mr. P. J. du Toit, of Zürich, contributes an elaborate and well-illustrated summary of Dr. Broom's views with regard to the derivation of mammals from the theromorphous or (in the wider sense of the term) anomodont reptiles. After referring to the development of the idea of the existence of such a relationship, the author describes the mammalian features observable in the theromorphous limb-skeleton and limb-girdles, and then proceeds to discuss Seeley's views as to the reptilian nature of Tritylodon. While admitting the possibility of that genus being a mammal, Mr. du Toit points out that its resemblances to the theromorphs are so marked that there is considerable justification for including it in that group. As regards the mammalian features in the theromorph skeleton, the following are regarded as the most important:—The union of the pubis and ischium to form an innominate bone, which is unknown in any other reptiles except certain chelonians. An entepicondylar foramen to the humerus, found also in the tuatera. The fusion of the coracoid with the scapula—paralleled among certain salamanders. The differentiation of the teeth into series. The union of the quadrate with the adjacent elements of the skull. The relations and mode of articulation of the two-headed ribs. The resemblance of the tarsus (especially as regards the tibio-tarsal position of the line of flexure) and phalanges to those of the monotremes. These features become more and more pronounced in the specialised types until they culminate in a form like Tritylodon, which may be regarded as a reptile actually in process of conversion into a mammal. By an increase in the length and strength of its limbs, accompanied by increasing power of sustained locomotion, and likewise by a special development of its dentition and jaws, one of the primitive theriodonts acquired, in consequence of this greater activity, a better kind of blood-circulation, warm blood, and a mobile, hairy skin—in other words, became a mammal.

Prominent among the articles in *Tropical Life* (June) is an account of two plantations of Ceara rubber in German East Africa. In this colony the trees of *Manihot Glaziovii* mature so rapidly that tapping of a very light nature is permitted already, in the third year. At this stage the incision method of pricking necessitates careful manipulation, and is said to produce about ¼ lb. of rubber per tree. In the first instance the trees were planted about 10 feet apart; but latterly a more open formation, in which they are set 13 feet apart, has been adopted. The chief pest is the white ant, which has to be combated by discovering and destroying its communities.

An article on the Coniferæ, communicated by Dr. A. W. Gothan to *Naturwissenschaftliche Wochenschrift* (June 18), deals mainly with the distribution of the various subfamilies in past epochs as compared with their distribution at the present time, but the author takes the opportunity of referring to changes in family relationships that have been proposed as a result of paying more attention to vegetative characters; in this connection reference is made to the proposition enunciated by Dr. F. Vierhapper, that the Taxaceæ, Taxoideæ, and Cupressineæ should be united in one family, the Taxocupressaceæ, on account of similarity in wood and leaf structures. The author also directs attention to the interest attaching to the fossil genus Baiera as a constituent of the group of Gingkophyta.

The sweet potato, *Ipomoea Batatas*, is one of those cultivated products of which the origin may be conjectured, but cannot be positively determined, and the varieties are so numerous and confused that identification and classification present unusual difficulties. These complexities are discussed in a bulletin issued as vol. iv., No. 1, of Contributions from the Botanical Laboratory of the University of Pennsylvania, where the author, Dr. B. H. A. Groth, describes a novel analytical method of scheduling that offers certain advantages, as in the incorporation of new forms. Representing each character by a letter, and the different variants of this character by numbers, each variety is scheduled under a series of arbitrary marks; thus the index of the variety Georgia begins A1B2C1D1 . . ., while A2B2C2D2 . . . is the beginning of the index of the variety Ticotea.

We learn from *The Agricultural News*, No. 236, that the Botanic Gardens of St. Vincent contain the only known specimen of *Spachea perforata*, a large tree estimated to be at least 100 years old. The leaves are lance-shaped, while the flowers are borne in terminal racemes, each flower containing small rosy petals and stamens, which are all fertile; the fruits are small. It is further stated that the flowers are distinct and attractive, and produced in great profusion; they are largely visited by bees. The tree is not only of botanical interest, but is decorative as well.

From the report on the operations of the Department of Agriculture of the Madras Presidency, 1909–10, recently to hand, it is possible to obtain a fair general idea of the work a handful of Englishmen are doing among the natives in improving systems of agriculture that have for centuries remained unchanged. Much of the time of the staff is occupied in teaching; but the value of their work is being increasingly recognised, and numerous samples are now sent in to the laboratories for report. Each year the report shows that some fresh progress has been made and some new economy discovered; the value of drilling seeds, of saving on the seed rate, and other matters are dealt with here.

The Bulletin of the Department of Agriculture, Jamaica, vol. i., No. 4, contains an excellent account, by Mr. Cousins, of the cultivation of the banana and the conditions under which success has been attained. Restricted as this plant was in the early days to virgin soils only, it was thought to be a crop that must soon cease to count in the islands. But the growers have learnt how to irrigate bananas, and also how to grow them on heavier types of soils, so that now there seems no obstacle to their cultivation wherever they would be thought useful. There are also some articles on local farm animals that will be of much interest to the technical reader, and, as usual in this publication, some excellent illustrations. Altogether the bulletin is an excellent number, on which its editor may be congratulated.

It has long been recognised that a liberal supply of protein is necessary for dairy stock, and the earlier German investigations pointed to the conclusion that a cow in full milk should receive 2·5 lb. of digestible protein daily per 1000 lb. live weight, and that the albuminoid ratio, *i.e.* the ratio of digestible protein to non-nitrogenous foodstuffs should be 1 : 5·4. But practical men soon began to depart from these values, and investigations in America justified their action, showing that less protein was necessary. An investigation recently published by Messrs. Woll and Humphrey, and published as Research Bulletin No. 13 of the University of Wisconsin Agricultural Experiment Station, while emphasising the need of an ample protein allowance, brings out the fact that only large milk-yielders can economically receive a large protein diet.

Colorado affords an interesting example of a country formerly devoted to ranching, and now becoming more closely settled, and consequently requiring a more general system of farming. An agricultural college and experiment station has for some time been engaged in studying the numerous problems involved in the transition, and the members of the staff issue frequent bulletins giving advice to settlers. No subject is too trivial for study; among a batch recently to hand is one on the care of farm machinery, and another showing how to build a wall or a house of adobe, a local soil that may be made to set like concrete. Exportable crops like fruit and potatoes naturally come in for considerable attention, and directions are also given for raising such crops as are needed for home consumption.

Mr. E. C. Andrews, of the Mines Department of New South Wales, has issued in the Journal of the Royal Society of New South Wales (vol. xliv., 1911, pp. 420–480), an interesting paper on the structure of eastern Australia. He adopts the view that Australia has not been subjected to any recent folding, and that the main features of its present relief are due to vertical earth movements. Australia has been thus divided into a western "horst" and an area of Eastern Highlands separated by the Great Plains. The Eastern Highlands are a peneplane, which, according to the author, were in Miocene times but little above sea-level.

The whole of the eastern coast of Australia is a geographical unit, and is due to a series of step faults. Mr. Andrews accepts this coast as constructed on the Pacific type. He holds that Australia was uplifted at the end of the Tertiary, and the resultant plateau has since been deeply dissected by the formation of the canyons. For the period of the uplift he proposes the name of the Kosciusko Period after the highest part of the plateau. His paper includes a valuable list of the fault scarps and sunken areas in eastern Australia.

A recent number of *The Geographical Journal* (vol. xxxvi., pp. 537–553) includes a valuable paper by Messrs. A. E. Kitson and E. O. Thiele on the geography of the Upper Waitaki basin in New Zealand, illustrated by a series of beautiful photographs. The authors describe the structure of this country in some detail, and with especial reference to its glaciation. In opposition to Haast's view, that the country was a plateau dissected by glacial action, they claim that the great valleys were all formed in pre-glacial times. From the authors' summary of the recent literature on the glacial geology of this part of New Zealand, it appears to be now generally accepted that the glaciers have only modified valleys which were pre-glacial in origin. The authors conclude that the lakes, valleys, and fiords originated along radial fractures. Their work throws considerable doubt upon the existence of the ice sheet, which is supposed by some authors to have covered most of the South Island of New Zealand. The three great lakes of the Waitaki basin are shown to be moraine dammed.

The Board of Education has issued the reports for the year 1910 (price 9*d.*) on the Geological Survey, the Geological Museum in Jermyn Street, the Science Museum at South Kensington, and the work of the Solar Physics Committee. The activity of all these bodies represents an important contribution by the State to scientific education. We note that, among many practical questions considered by the Survey, building stones are to be placed on the roof at Jermyn Street for comparative tests of the effect of the London atmosphere. We have also received three recent publications of the Geological Survey from the Board of Agriculture and Fisheries. Mr. Strahan describes the geological model of Ingleborough and district, now in the museum at Jermyn Street. This pamphlet (price 4*d.*) is beautifully illustrated by a geological map and a photograph of the model before colouring, and will appeal to teachers of geography. Dr. B. N. Peach provides another educational pamphlet in his "Description of Arthur's Seat Volcano" (price 6*d.*), which includes a geological map showing the relation of the mass to the city of Edinburgh. Messrs. Reid, Barrow, and Dewey have written the explanation of the colour-printed sheets 335 and 336 of the English map (price 1*s.* 6*d.* each), the memoir being on the country around Padstow and Camelford (price 2*s.* 3*d.*). The petrography is of interest, especially in connection with the pillow-lavas, and the district includes old workings for stream-tin, pits in china-clay, and the great quarry of Delabole in slate of Devonian age. A quarto palæontological memoir by Mr. T. Thomas deals with the British Carboniferous Orthothetinæ (price 2*s.*), and is accompanied by a fine plate by Mr. Brock.

The officiating director-general of Indian observatories (Mr. J. H. Field) has issued a memorandum, dated June 8, on the conditions prevailing before the advance of the south-west monsoon of 1911. The monsoon rainfall in India is known to be affected by many external conditions, and among those believed to be the most important are the barometric pressure in South America and the Indian Ocean and the snowfall in North-west India, &c. After examining these conditions on the plan adopted by Dr. Walker, it is estimated that the total rainfall for the period June–September will not differ from the normal by more than about 5 per cent., a defect being more likely than an excess.

The results of rain and river observations made in New South Wales during 1903–8 have been published by the Commonwealth Bureau of Meteorology. These include all available rainfall totals from 2298 stations, with monthly maps and notes for each of those years. In addition to the rain maps and tables for the above period, the records are given for all previous years. These values have been included in an average map for all stations for which means of not less than fifteen years were available; some of the results of this map were referred to in NATURE of September 22, 1910. The list of heavy daily rainfalls previously published by the late Government astronomer has also been brought up to date.

The Akademische Verlagsgesellschaft of Leipzig has issued a small pamphlet on "Radiumnormalmasse und deren Vervendung bei radioaktiven Messungen," by Prof. Rutherford. It deals with the necessity of producing an international standard of radium, which has arisen owing to the differences recently discovered between the standards used in different countries. For the comparison of standards it suggests a compensation method, depending on the use of a constant source of radiation like uranium oxide and of the inverse square law. For small standards, such as are used in the determination of the radium content of rock specimens, solutions of radium salts containing one millionth of a milligram of radium per cubic centimetre are suggested. The conclusions as to the establishment of the radium standard arrived at by the Brussels conference last year are reproduced. They have already been given in these columns (October 6, 1910, vol. lxxxiv., p. 430).

The *Revue General des Sciences* for June 30 contains the annual *revue* of astronomy for the year 1910 by M. P. Puiseux, of the Paris Observatory. It is divided into sections, which are devoted to planets and comets, the sun, the stars and nebulæ respectively. In the first section, the work of Cowell and Crommelin on Halley's comets, of Eddington on the theories of formation of the tails of comets, of Backlund on Encke's comet, and of Lowell, Campbell, and Albrecht on the markings of Mars, all receive attention. The section on the sun is devoted mainly to the work of Hale and of Deslandres on the constitution of sun spots; that on the stars to the spectroscopic work which has been done in order to determine the motions in the line of sight of a greater number of stars, and so provide means of testing more accurately the theories of Kapteyn and of Eddington that there exist two lines of main drift in their proper motions.

It is difficult for anyone with normal colour-sense to appreciate the mental picture of a colour-blind person. An interesting experiment for illustrating what is seen by people with a defective red sensation—the commonest form of colour-blindness—has been devised by Mr. C. R. Gibson. The device consists of a pair of spectacles with plane signal-green glasses and a series of coloured wools. When the glasses are put on, of course, no red rays can enter the wearer's eyes, so he is in the position of a person who cannot distinguish red as a colour. He will thus match scarlet wool with black, yellow with green, pink with light blue, or crimson with dark blue, and will see any coloured object as the majority of colour-blind people see them. The experiment is instructive as well as amusing, and it provides a simple means of realising the effects of colour-blindness. The spectacles and wools are manufactured by Mr. J. Trotter, optician, Glasgow, and the price at which they are sold is 2*s.* 6*d.*

We have received from Messrs. Isenthal and Co. their latest publication on Moscicki condensers, and Giles valves as applied to the protection of electric power transmission lines against atmospheric disturbances and surges. High-tension condensers for radio-telegraphy in particular are also dealt with. The publication is exceedingly well produced, the theory of surges and the practice of line and station protection being dealt with in part i., while part ii. deals chiefly with condenser batteries and choking coils and radio-telegraphy. A summary of the contents of various standard books dealing with these subjects is briefly given and set out with remarkable clearness in the brief description given. A noteworthy chapter is that dealing with the selection and design of plant, including generators, motors, transformers, and switches, and some very useful tables are included, giving safety coefficients for cables. The pamphlet is well illustrated with photographs and diagrams of the apparatus described. The Moscicki condensers and Giles valves are once again very fully dealt with, together with a list of places where they have been installed.

Messrs. Watson's price list of apparatus for electro-therapy and diagnosis is too well-known to require detailed description. The novelties are principally found in the therapeutic section. The "Prana" carbon dioxide snow apparatus is described and illustrated. It is intended for the treatment of nævi and lupus, warts, and other superficial diseases. The apparatus is made in three different sizes. The carbon dioxide is contained in a cylinder, and is allowed to escape into a receptacle which permits of free evaporation with the production of carbon dioxide snow in the form of a crayon 5 inches long by 1 inch or ½ inch in diameter. A special high-frequency apparatus is constructed for diathermy or thermo-penetration. In this apparatus the heating effect of the high-frequency current is encouraged and used. Considerable benefit appears to have been obtained in various rheumatic conditions and neuralgia, sciatica, &c. These new high-frequency currents are at a voltage less than 3000 volts, but currents of 500 to 3000 milliamperes are used, and with the strongest doses the patient feels absolutely nothing except the increase in temperature. Thermometers introduced in animals prove that the increase is internal, and greatest in the path between the electrodes. Beyond the effects produced by the heat there are no other physiological or chemical effects. When the current is employed long enough, albumin coagulates; and tumours, &c., can be destroyed by these means: coagulated tissues behave like foreign bodies, and are gradually expelled. In the radio-active substances meso-thorium, of the same activity as pure radium bromide, is quoted for at the price of 12*l.* 10*s.* per milligram. Radio-thorium is listed at the price of 1*l.* per gramme. Several special radium applicators are illustrated.

Engineering for July 14 contains an illustrated description of a "Stock" oil-fired converter which is in operation at the works of the Darlington Forge Co., Ltd. All classes of steel can be manufactured in this converter, from soft-steel castings to special steels of the highest class. In form it resembles the ordinary Bessemer converter; it is lined with ordinary silica fire brick, and is used, not only for the conversion or blowing of iron, but also for melting the actual charge of iron and scrap by means of oil fuel, no separate cupola being required. The oil fuel—crude petroleum—is used for melting the charge, and when this has been effected the oil pipes are withdrawn and blowing commences. The air does not enter at the bottom and pass up through the molten metal as in a Bessemer converter, but is blown down on the top of the metal. For a three-ton converter, melting takes about 1½ hours and blowing from fifteen to twenty minutes, the total time, including charge, being about two hours. As an example of the punishment the steel will stand, the following may be mentioned: A steel wheel, about 4 feet 9 inches in diameter, was dropped edgewise on a steel ingot from the following heights—5 feet, 10 feet, 15 feet, and 20 feet, without showing signs of fracture. A drop of 40 feet on the rim broke one spoke. After this four more drops of 40 feet on edge caused no further fracture either to the rim or the spokes, and the wheel was finally broken up by a steel three-ton ball dropped ten times on the boss from a height of 40 feet. Some remarkably thin castings have been made.

OUR ASTRONOMICAL COLUMN.

Comet, 1911*b.*—Observations of the new comet discovered at the Lick Observatory on July 6 are recorded in No. 4511 of the *Astronomische Nachrichten.* Prof. Abetti, at Arcetri, on July 8, estimated the magnitude as 6·0, and Prof. Wolf found, the same day, that the photographic magnitude was 7·5; his photographs show a tail.

MM. Lagrula and Schaumasse observed the comet at Nice on July 8, and, in No. 2 of the *Comptes rendus* (July 10), they describe it as a bright object presenting a globular condensation surrounded by a nebulosity which is extended towards the S.S.W.; the whole appears to have a diameter of about 2·5′.

From observations made on July 6, 8, and 9, Prof. Kobold has determined the following elements, which are said to be similar to those of Comet 1790 I.

Elements.

$$\begin{aligned} \mathrm{J} &= 1911 \text{ June } 20{\cdot}6354 \text{ (M.T. Berlin)} \\ &\left.\begin{aligned} \omega &= 99^\circ\ 31{\cdot}99' \\ \Omega &= 172^\circ\ 27{\cdot}52' \\ i &= 148^\circ\ 39{\cdot}25' \end{aligned}\right\} 1911{\cdot}0 \\ \log q &= 9{\cdot}89936. \end{aligned}$$

An ephemeris derived from these elements gives 4h. 26m. 27s., +32° 54·0′ as the position for July 20 (12h. Berlin M.T.), with a daily decrement of about 2m. in R.A. and 13′ in declination. The calculated magnitudes for July 12 and July 20 are 6·5 and 6·4 respectively. Given a clear horizon the object should be visible, with opera-glasses, from midnight to dawn; at about 10.30 it rises some 30° east of north, and at 2 a.m. is about 20° above the horizon. The present position is about one-third the distance between ι Aurigæ and ζ Persei from the former star along a straight line joining the two.

The Solar Eclipse of April 28, 1911.—Dr. L. A. Bauer sends us a detailed narrative of a journey to Tau Island of the Manua group, where observations were made of the total solar eclipse of April 28, 1911. The U.S. cruiser *Annapolis* took Dr. Bauer from Pago-pago harbour, Tutiula Island, to Tau. Dr. Bauer's prime object was to secure magnetic observations during the eclipse, and he arranged for simultaneous observations to be made at the five magnetic observatories of the U.S. Coast and Geodetic Survey, as well as at Apia, Christchurch, and Melbourne. His attention was, therefore, devoted to this subject, and the astronomical observations were made by officers of the ship.

Mr. Abbot, director of the Astrophysical Observatory of the Smithsonian Institution, provided Dr. Bauer, at short notice, with a hand-driven, equatorially mounted, double-lens camera of about 11½ feet focus, and suggested one exposure of 15s., and another as long as possible—about 1m. 10s. These exposures were made, and four negatives were obtained as the result. On account of a difficulty with the sighting telescope just before totality, a hastily-constructed finder had to be employed, and this did not prove wholly successful as a means of keeping the image